

Dec 11th, 3:40 PM - 5:20 PM

# Damming a bedrock cut to daylight a buried stream under an abandoned railroad crossing in the Eel River Canyon of northwest California

Michael Love

*Michael Love & Associates, Inc.*

Darren Mierau

*North Coast Director, California Trout, Inc.*

Follow this and additional works at: [https://scholarworks.umass.edu/fishpassage\\_conference](https://scholarworks.umass.edu/fishpassage_conference)

---

Love, Michael and Mierau, Darren, "Damming a bedrock cut to daylight a buried stream under an abandoned railroad crossing in the Eel River Canyon of northwest California" (2018). *International Conference on Engineering and Ecohydrology for Fish Passage*. 19.  
[https://scholarworks.umass.edu/fishpassage\\_conference/2018/December11/19](https://scholarworks.umass.edu/fishpassage_conference/2018/December11/19)

This Event is brought to you for free and open access by the Fish Passage Community at UMass Amherst at ScholarWorks@UMass Amherst. It has been accepted for inclusion in International Conference on Engineering and Ecohydrology for Fish Passage by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact [scholarworks@library.umass.edu](mailto:scholarworks@library.umass.edu).

# Damming a Bedrock Cut to Daylight a Buried Stream

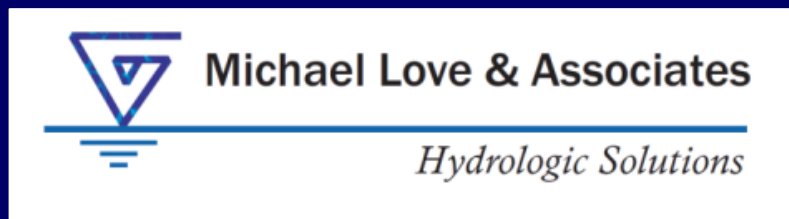
Woodman Creek, Eel River Canyon, NW California



Abandoned Northwestern Pacific Railroad  
in the Remote Eel River Canyon. Photo: Mike Weir

**Michael Love P.E.**

Michael Love & Associates, Inc.  
Arcata, California, USA  
[mlove@h2odesigns.com](mailto:mlove@h2odesigns.com)



# California's Doomed Northwestern Pacific Railroad

- Built 1913, providing overland transport from San Francisco to Eureka (436 km)
- Eel River Canyon Section of Track
  - Remote (limited road access)
  - Unstable geology
  - Numerous collapsed tunnels, avalanche shelters, railcars abandoned in river
  - State took over bankrupt rail line in 1992
  - Last Train through Canyon was 1996
- 2011 fish passage assessment of rail line found **Woodman Creek** barrier (at km 262.2) to be highest priority
- State dissolved railroad in November 2018







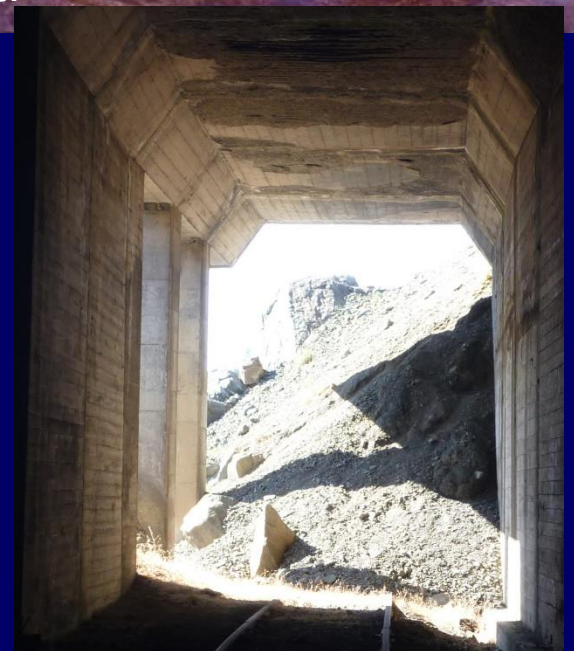
photo: D. Sperdelozzi



photo: Friends of the Eel



from: Liquid Fusion Kayaking





# Woodman Creek at Confluence with Eel River

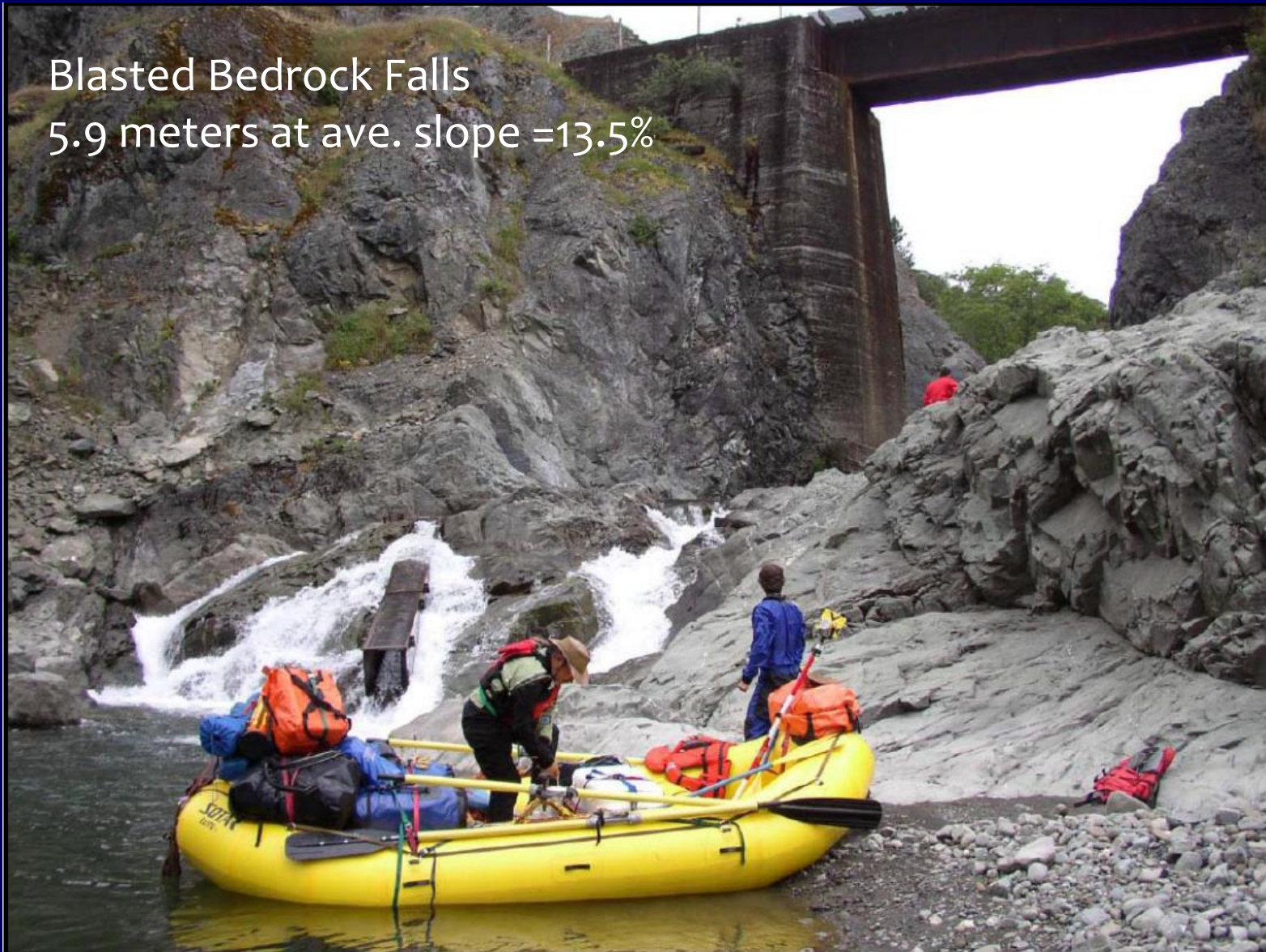


Photo: Mike Weir

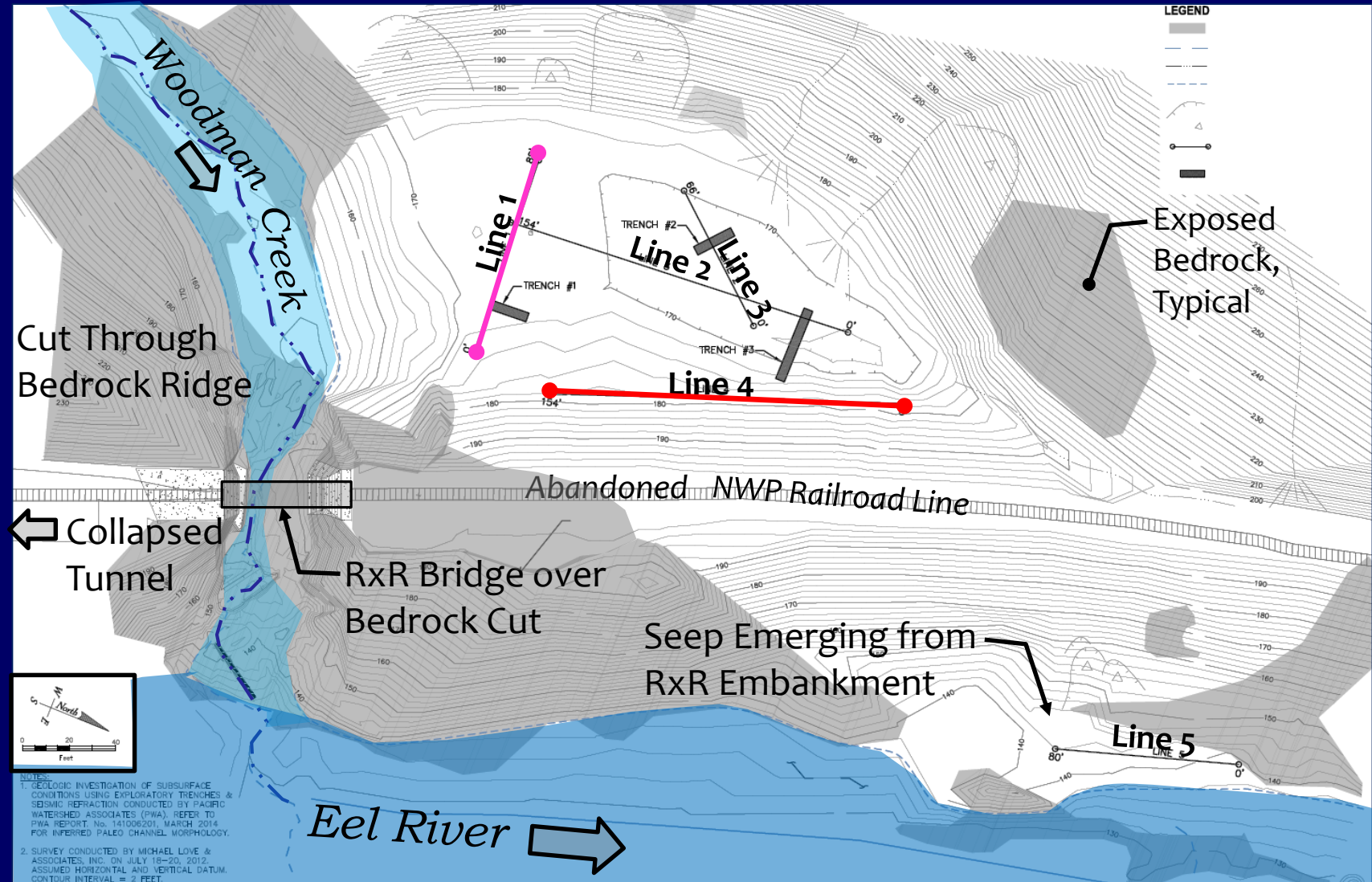


# Dilapidated and Ineffective Denil Fish Ladder at Bedrock Cut

Blasted Bedrock Falls  
5.9 meters at ave. slope = 13.5%



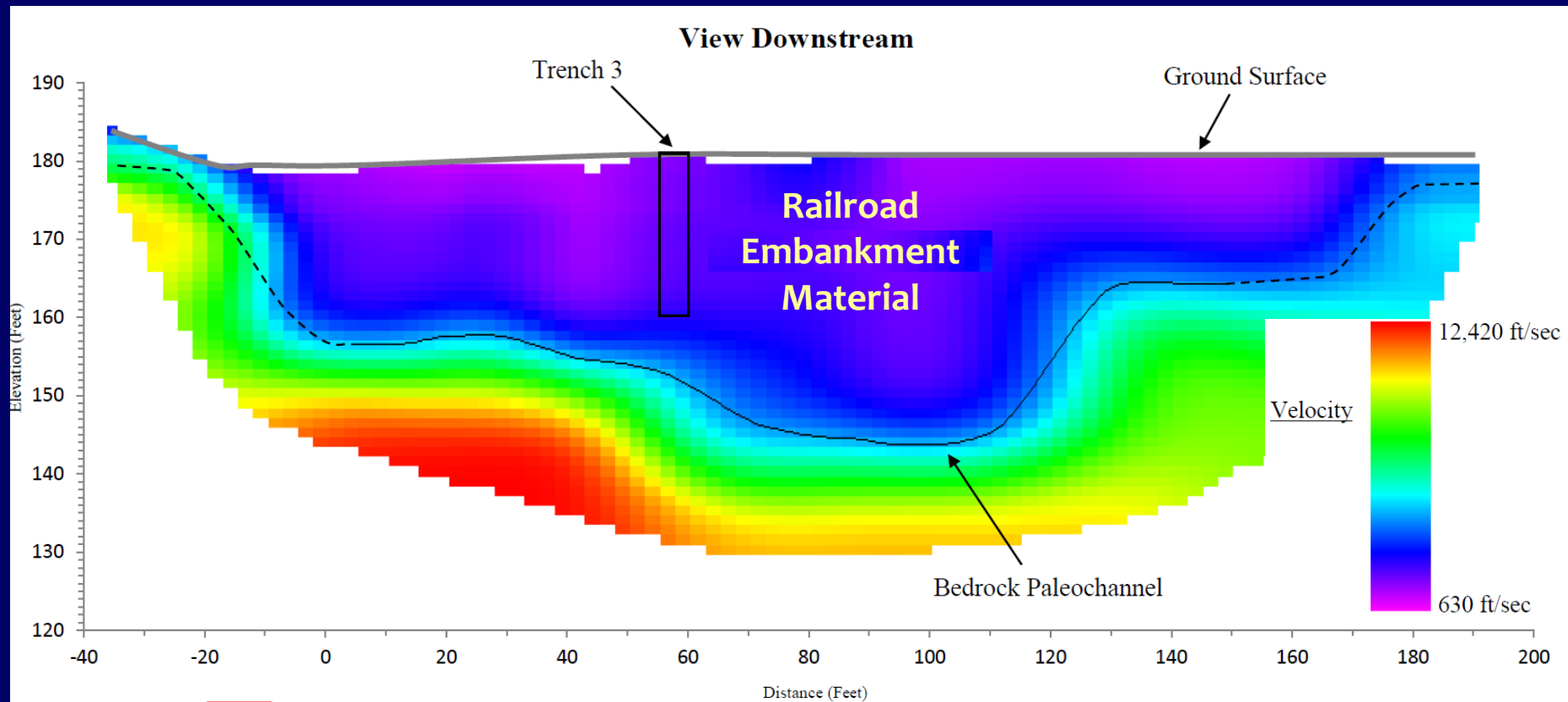
# Topographic Survey and Subsurface Investigations





# Refraction - Line 4

## Along Exposed Toe of RxR Embankment Perpendicular to Buried Channel



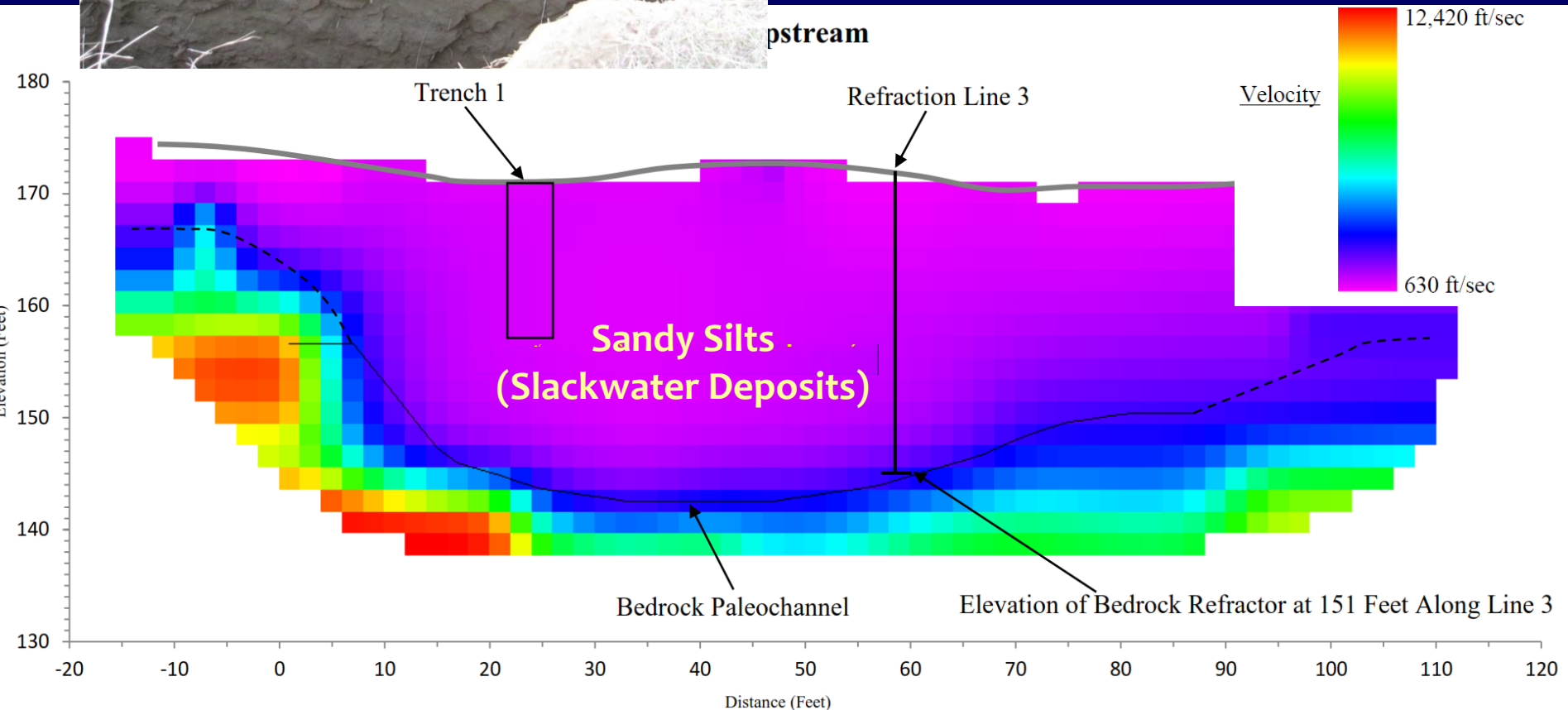


Slackwater  
Deposits

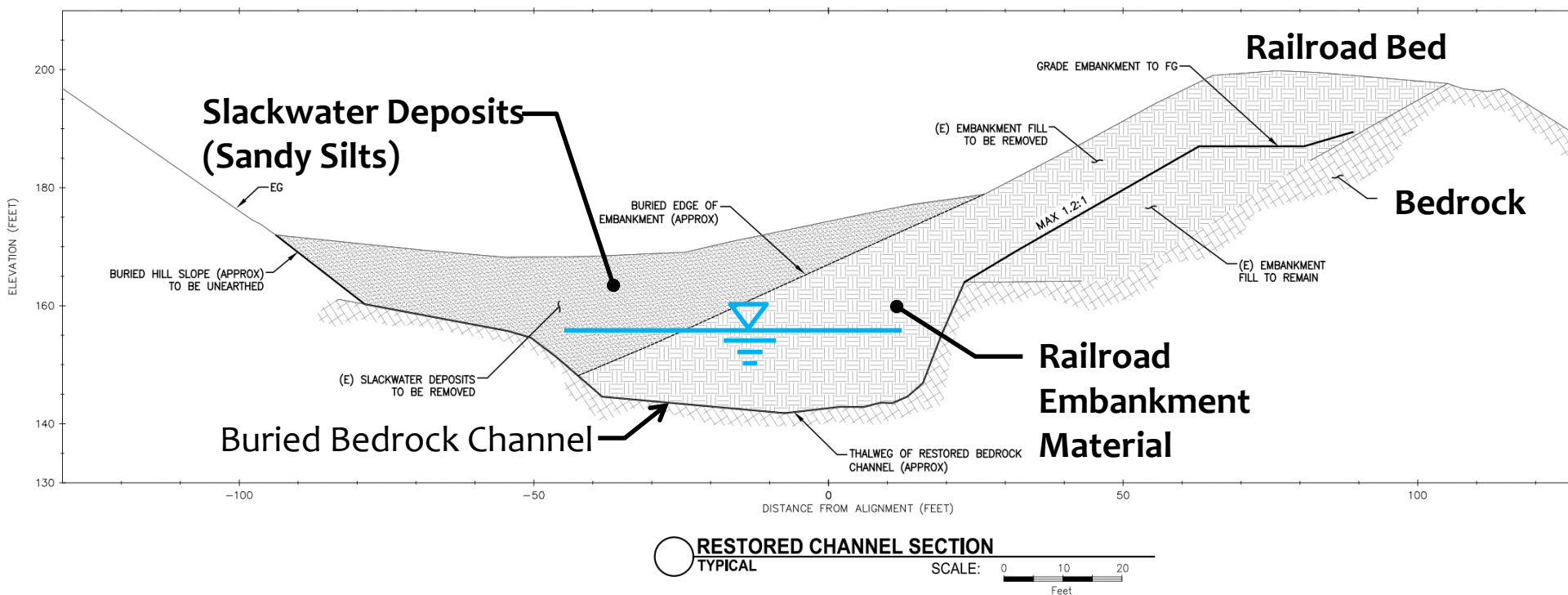
Silt with Sand (Slackwater Deposits)

# Refraction - Line 1

## Perpendicular to Buried Stream Channel

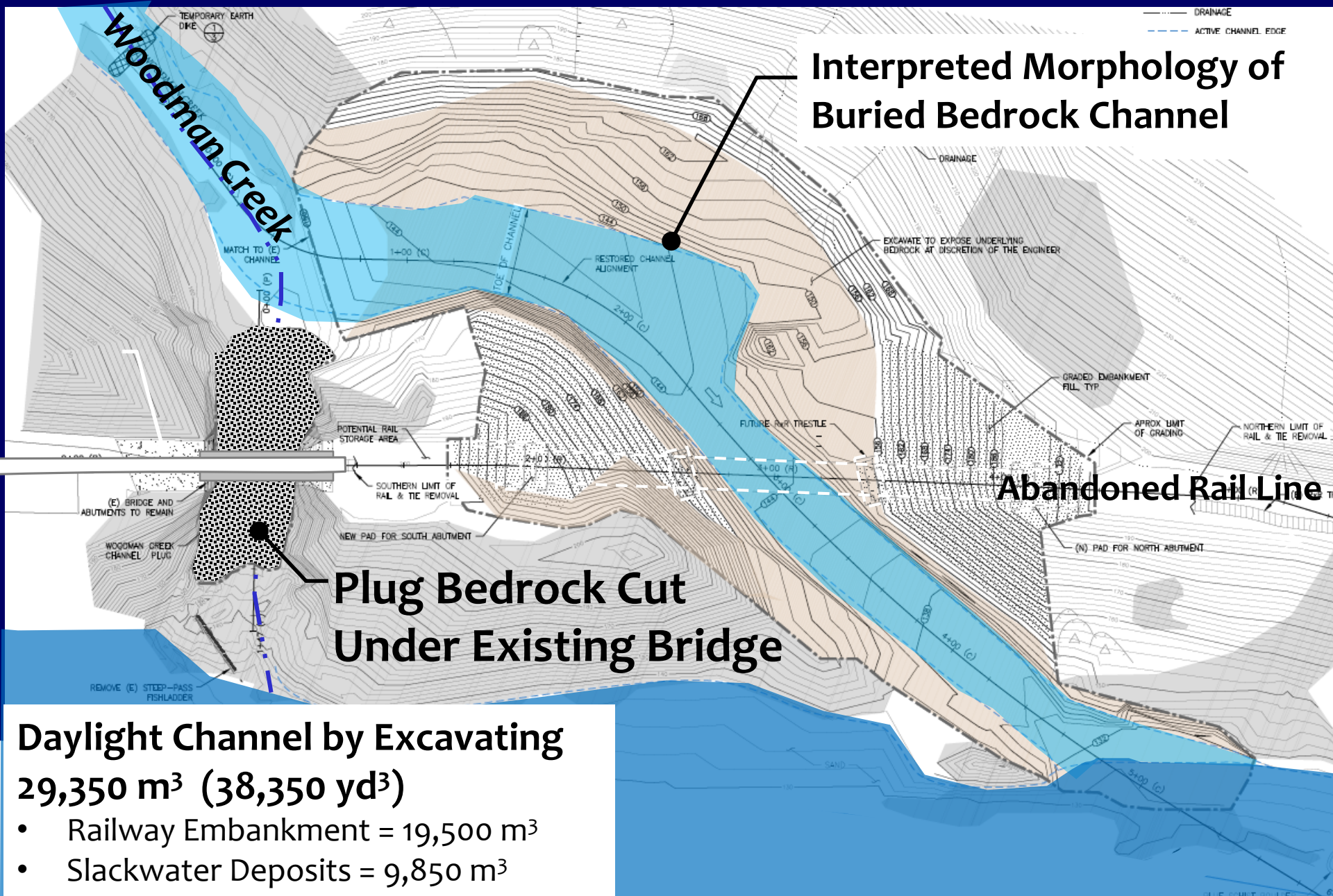


# Typical Section of Soil Types Based on Geologic Investigation





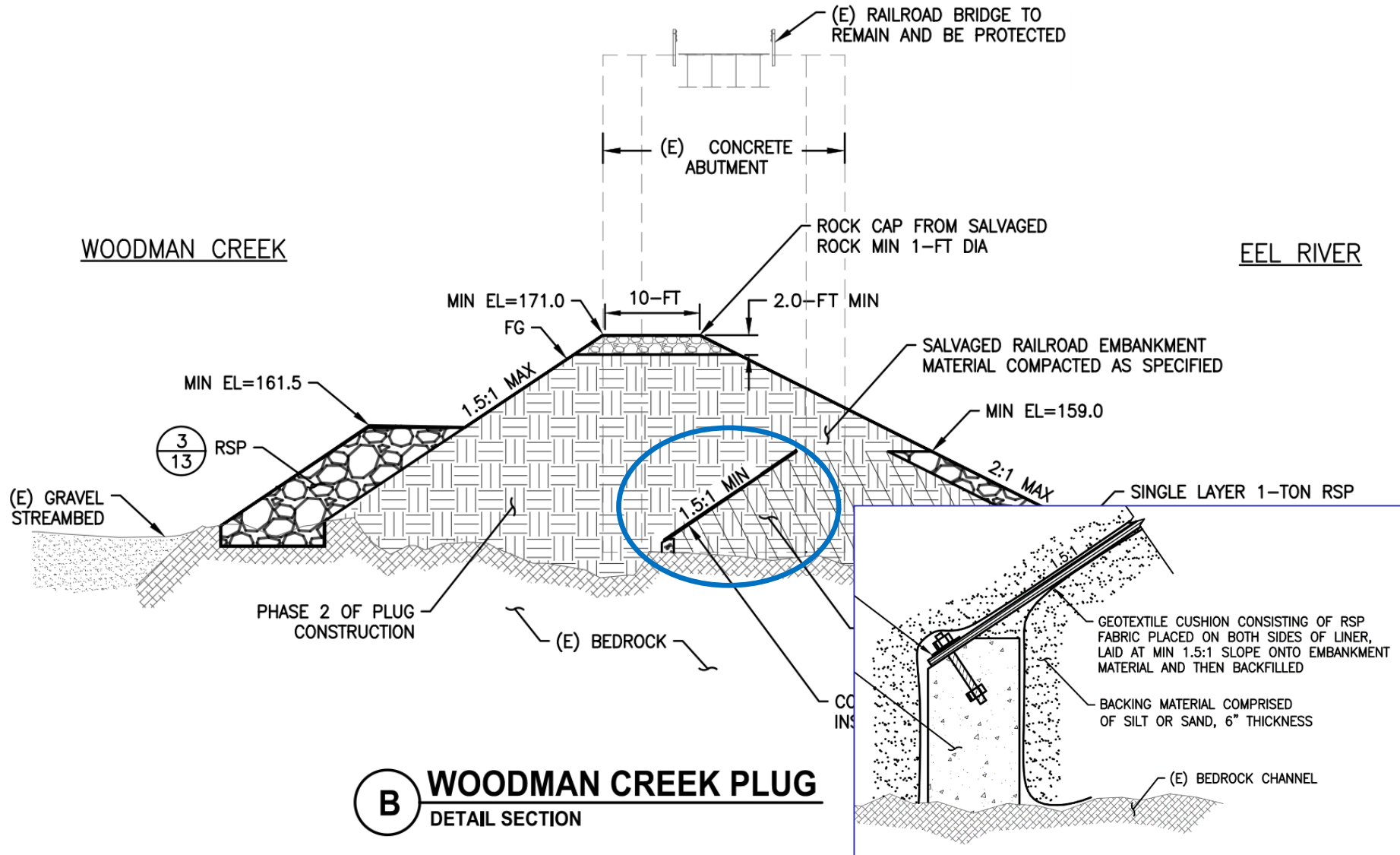
# Developed Surface Model of Buried Channel



**Daylight Channel by Excavating  
29,350 m<sup>3</sup> (38,350 yd<sup>3</sup>)**

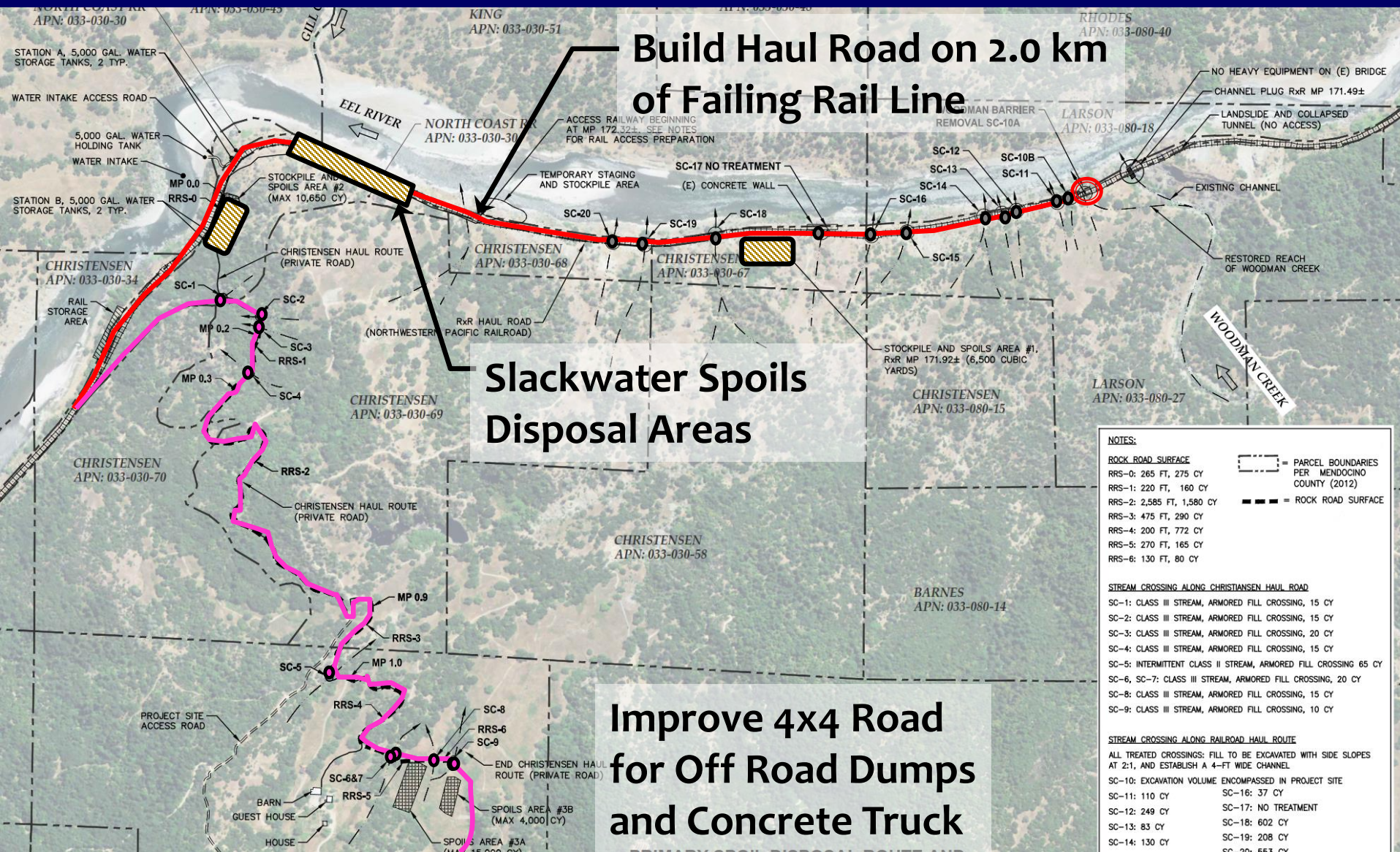
- Railway Embankment = 19,500 m<sup>3</sup>
- Slackwater Deposits = 9,850 m<sup>3</sup>

# Design of the Channel Plug





# Site Access and Spoils Disposal





# Daylighting the Buried Channel





# Salvaged Rock from Embankment Material for Plugging the Bedrock Cut





# Setting Geomembrane Liner for Plug





# The “Plugged” Bedrock Cut fom Eel River





# The “Plugged” Bedrock Cut fom Woodman Creek





# Video











# Project Metrics

**14**

MILES OF PRIME SPAWNING  
AND REARING HABITAT  
RECONNECTED

**\$2.2M**

PUT INTO THE LOCAL ECONOMY

**33**

LOCAL PEOPLE EMPLOYED:  
CALTROUT STAFF, LABORERS,  
ENGINEERS, TECHNICIANS.

**38,000**

CUBIC YARDS OF EARTH MOVED

**3**

TENTS DESTROYED BY BEARS



# Acknowledgments



American Rivers  
*Rivers Connect Us*



Michael Love & Associates

*Hydrologic Solutions*

**PacificEarthscape**  
GENERAL ENGINEERING CONTRACTOR



Ross Taylor  
and Associates

Landowners:

Ron Christensen

Micky Bailey